

# PATENT SPECIFICATION

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## DRAWINGS ATTACHED

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## (54) IMPROVEMENTS IN OR RELATING TO THE PREPARATION OF BLOCKS OF FROZEN EDIBLE MATERIAL

(71) We, EISENWERKE KAISERSLAUTERN G.m.b.H., a German Company of 30 Barbarossastrasse, Kaiserslautern, Pfalz, Germany, do hereby declare the invention, 5 for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

The present invention relates to the preparation of blocks, in slab, slice or other 10 form, of cleaned and filleted frozen fish flesh, the frozen flesh of vertebrates or other frozen edible material.

There are many known methods and devices 15 for the processing of flesh or meat into blocks. Thus, it is known to compress portions of fresh fish or fresh meat into blocks with the aid of a two-piston press to a pressure of approximately 0.5 atm. in a 20 mould and afterwards, or simultaneously, to deep freeze the blocks in said mould, ie to reduce their temperature to the range  $-10^{\circ}\text{C}$  to  $-30^{\circ}\text{C}$ .

In another known method a platform or 25 slab conveyor belt having mounted thereon boxes or moulds containing fish portions, passes under a roller press, whereupon the portions of fish are pressed into the moulds with a slight pressure and the resultant 30 slightly compressed blocks are subsequently deep frozen.

It is also known to compress pieces of 35 fresh fish in an unfrozen and wet condition into block form and then to return the juices squeezed out during the compressing process back to the blocks by injection, whereupon the resultant fillet packs are then frozen.

Finally, it is known to grind fish or other 40 flesh in a worm mill, then to freeze the composition in the encased mouthpiece of the worm press and on ejection therefrom to cut portions from the issuing endless length of frozen ground flesh.

45 It will be appreciated that there is a [Price 25p]

common factor in all these known methods in that the meat or fish is pressed in a wet unfrozen condition, a feature which, as is the case in the treatment effected in a mill, as in the last example, leads to considerable 50 deformation and comminution of the muscle fibre texture. Therefore, in its subsequent final condition of use, the flesh has scarcely any resemblance to the usual appearance of a portion of fish or meat. The loss of 55 fluid from the tissues is even more unpleasantly apparent in the known processes as was evident in one of these processes where the juices were subsequently re-injected. Apart from its complicated nature, 60 this re-injection method is not suitable for retaining the muscle fibre texture and the natural distribution of solid and liquid components of the fish or meat.

In the known methods in general, there- 65 fore, the portions of fish are deposited into containers in a pressureless or almost pressureless and fresh condition and only then are they deep frozen. A block prepared in this manner has no uniform thickness and 70 its texture is not homogeneous. Again, if such methods are used on board ship, the available storage capacity of the ship is not used to the best possible advantage. Since 75 these blocks in the form of slabs are also finally cut up into fillet packs of normal commercial dimensions, disadvantages result from the different weight proportions of the individual parts of the slabs. Attempts have hitherto been made to sur- 80 mount this by weighing the fillets before they are deep frozen. This, however, involves a great deal of lost time and is practically impossible or at least impracticable on board ship. 85

The primary object of the present invention is to overcome these difficulties and in particular to enable meat, particularly fish meat to be converted into deep-frozen fillet 90 packs whilst retaining to a considerable ex-

lent the texture of its fresh condition and at the same time to ensure that packs of blocks or slabs have a predetermined width and/or depth to ensure uniformity in packing 5 and distribution.

The method of preparing blocks of edible material according to the present invention is characterised in that portions of flesh edible material or fillets to be treated are 10 fed to a cooled compression chamber in a deep-frozen condition prior to compression in said chamber into slab, slice or other block form.

Thus by the present invention it has unexpectedly become apparent that deep-frozen fillets can be immediately compressed 15 into blocks in suitably formed compression chambers without the previously accepted destruction of the muscle fibre tissue and, in particular, without the also previously accepted dehydration of the flesh which reduced its quality. 20

Furthermore with the invention a homogeneous, stable block of comparatively high specific gravity is formed. The specific gravity of all blocks produced is the same; thus, the blocks slabs or slices can be cut up into 25 portions of fillet pack sizes in the normal manner of exactly identical weight.

The apparatus for carrying out the method comprises a press having a cooled compression chamber and a pressure piston adapted for displacement therein under the control of a cylinder, a closure piston operating 30 as a closure valve for opening into said chamber under the control of a cylinder and a filling piston also under the control of a cylinder. 35

Since the apparatus is normally erected 40 on warm premises, the compression chamber is deep-cooled before each use to ensure that the deep-frozen fillets remain deep-frozen therein even when subjected to the pressure exerted on them when in the 45 chamber.

Further features of the invention and details of the advantages achieved thereby will be apparent from the following description of the method and apparatus with reference 50 to the accompanying diagrammatic drawing of one embodiment by way of example.

In the embodiment illustrated which is suitable for hydraulic operation, a compression chamber 2 is mounted on a bed 1, 55 which houses the hydraulic control mechanism (not shown) for a three piston press co-operating with the chamber 2. The three piston press includes a compression and expulsion piston 3 which is displaceable within the chamber 2 under the control of a cylinder 4, a closing piston or valve 5 operated 60 by a cylinder 6 and a filling piston 7 actuated by a cylinder 8.

In the embodiment shown, the compression chamber 2 is horizontally mounted on 65

the bed 1 but it will be appreciated that any other arrangement of pressure chamber and the three piston press is also possible.

The pressure chamber 2 is cooled by means of refrigerators 9 and 10 which are 70 respectively provided above and below the compression chamber 2, by means of which the pressure chamber is undercooled each time before it is used to ensure that the inserted deep frozen fish fillets or the like remain deep frozen when in the chamber 2 75 even under the action of pressure.

In the embodiment illustrated a table top 11 is provided at one end of the horizontal pressure chamber 2 to receive one or more 80 cassettes or the like holders 12 which are displaceable transversely to the axis of symmetry of the chamber 2 so as to be brought into, and removed from, a position in registration with an opening 13 controlled by 85 the piston 5. The cassettes are of substantially the same cross-sectional form as the chamber 2. They may be transversely displaced by manually sliding them on the table 11, or if desired the table top may be displaced with the cassettes carried thereon. 90 The cassettes are adapted to receive loose unpressed or only slightly compressed deep-frozen fillets for transfer into the pressure chamber 2 and, after compression in and 95 expulsion from said chamber, they receive the formed fillet blocks and are conveyed with their contents away from the apparatus. As an alternative to the table top 11, a conveyor belt or the like may, of course, 100 also be provided to permit the phased supply and removal of the cassettes which are then filled and emptied elsewhere.

Before the commencement of the operation the pressure piston 3 is in its illustrated starting position, i.e. at the left-hand 105 end of the chamber 2. The closure piston 5 is in its lower position leaving the filling and expulsion aperture 13 of the chamber 2 unimpeded. The filling piston 7 is at its 110 right-hand end position.

In this position of the parts the filling piston 7 is triggered by an appropriate control of the cylinder 8 and pushes the deep frozen fillets 14 out of the cassette 12 through the 115 opening 13 into the chamber 2, whereupon the filling piston 7 returns to its illustrated position. The closure piston 5 is now raised to seal the chamber 2 and the pressure piston 3 is displaced to the right to 120 compress the contents of the chamber 2 into a compact homogeneous block. The closure piston 5 is then drawn downwardly and the resultant block is expelled by the piston 3 through the opening 13 of the 125 chamber 2 into the cassette 12. The cassette 12 is removed or exchanged in any desired manner and another cassette containing loose deep-frozen fillets is brought to the opening 13 in the chamber 2. Simultaneous- 130

ously the pressure piston 3 returns to its starting position and the parts are now ready for the commencement of the next pressing operation.

- 5 The method of the present invention, with the use of the apparatus of the present invention ensures the formation of deep-frozen fillet blocks or the like of the same specific gravity without destruction of the muscle fibre texture and, particularly, without the harmful or quality-reducing dehydration of the treated flesh. Thus, for the first time, it is possible to provide fillet blocks of perfect quality which can then be divided in a simple manner into portions of equal weight for packing.

#### WHAT WE CLAIM IS:—

1. A method of preparing blocks of cleaned and filleted fish flesh, the flesh of vertebrates or other edible material, characterised in that portions of flesh, edible material or fillets to be treated are fed to a cooled compression chamber in a deep-frozen condition prior to compression in said chamber into slab, slice or other block form.
2. A method as claimed in Claim 1 in which portions of frozen flesh edible material or fillets are inserted loosely and compressed, or with the application of slight pressure, into a cassette which is adapted to the cross-sectional form of the compression chamber, and are then transferred from the cassette to the chamber.
3. Apparatus for carrying out the

method as claimed in Claims 1 and 2 which includes a press having a cooled compression chamber and a pressure piston adapted for displacement therein under the control of a cylinder, a closure piston operating as a closure valve for an opening into said chamber under the control of a cylinder and a filling piston also under the control of a cylinder.

4. Apparatus as claimed in Claim 3, in which a sliding table is provided for supplying the cassettes to a position in registration with the opening in the compression chamber.

5. Apparatus as claimed in Claim 3, characterised in that the cassettes are displaced on a synchronised travelling belt to a position in registration with the opening in the compression chamber.

6. A method of preparing blocks of cleaned and filleted fish flesh, the flesh of vertebrates or other edible material, substantially as described herein.

7. Apparatus for preparing blocks of cleaned and filleted fish flesh, the flesh of vertebrates or other edible material, constructed and arranged to operate substantially as described with reference to, and as illustrated in, the accompanying diagrammatic drawing.

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1 SHEET

COMPLETE SPECIFICATION

This drawing is a reproduction of  
the Original on a reduced scale.

